

TITLE OF THE INVENTION

Amusement Device Completing Composite Image by Reflection

FIELD OF THE INVENTION

The invention relates to an amusement device providing a composite image by combining a first image component on an image carrying substrate seen by direct transmission from a front of the carrier with a second image component seen simultaneously by reflection in a mirror behind the carrier.

BACKGROUND OF THE INVENTION

An amusement device for providing a composite image formed by combining a first image component on an image carrying substrate seen by direct transmission from a front of the carrier with a second image component seen, simultaneously, by reflection in a mirror behind the carrier is known from the prior art and has been commercial for many years.

In particular, U.S. patent 4854591, issued in 1989 and invented by the present applicant, teaches a three dimensional puzzle in which cubes or tiles having visual material thereon are arranged on or in front of a reflective surface so that when the cubes or tiles are correctly arranged, the image of the visual material on the cubes or tiles seen, simultaneously, by direct transmission which forms the first image component and the reflected image of the visual material which forms the second image component are seen simultaneously, the image component combine to form a continuous composite image.

However, as the second, reflected image component of the composite image is simply a laterally inverted image of the first image component simultaneously seen directly by the spectator, the composite image resulting from the combination of the first and second image components can be readily predicted or is obvious to the spectator, the more so as the first image is

1 symmetrical, so that the resulting composite image is not surprising and can be
2 readily predicted by casual observation.

3 In a development of the invention taught by the above patent, which
4 development has been widely sold for many years under the name "Rubik's
5 illusion", also invented by the present applicant, the tiles or blocks arranged in
6 front of an upright mirror have upper faces which are corrugated with each
7 corrugation extending parallel to the mirror surface and having the cross-section
8 of an isosceles triangle providing an image carrying surface with first and second
9 upwardly inclined facets alternating as they extend away from the mirror and
10 providing, respectively, first and second sets of image fragments of the first and
11 second image components, facing forwards towards the spectator and rearward
12 for reflection in the mirror respectively. On some of the tiles or blocks, the second
13 sets of image fragments differ from the first set of image fragments, but in color
14 only, so that second image component seen by reflection is not identical to the
15 first image component seen by direct transmission. Nevertheless, as a result of
16 the inclination of the facets required for effective viewing both from the front and
17 by reflection in the mirror, the spectator can look down vertically on the image
18 carrier/substrate to see the different color on the rearward facets sides during
19 normal handling, while the remainder of the second image component is identical
20 to the first image component which is also symmetrical, so that the resulting
21 composite image can be readily predicted by casual observation.

22 **SUMMARY OF THE INVENTION**

23 It is one object of the invention to provide an amusement device of a type in
24 which a composite continuous image resulting from the combination of a first image
25 component provided by a first set of image fragments on an image carrying
26 substrate seen by direct transmission with a second image component provided by
27 a second set of image fragments on an image carrying substrate seen,
28 simultaneously, by reflection in a rear mirror cannot be readily predicted by a
29 spectator casually viewing the image carrying substrate.

1 According to the invention, the second set of image fragments providing the
2 second image component seen by reflection is differently shaped to and laterally
3 inverted in relation to the first set of image fragments providing the first image
4 component seen, simultaneously, by direct transmission.

5 As a result, the composite image formed by the combination of the first and
6 second set of image fragments viewed directly and by reflection in the mirror,
7 respectively, cannot usually readily be determined by a casual inspection of the
8 image carrying substrate even when all image fragments are seen, so that the
9 composite image can be really surprising and a source of amusement.

10 According to one aspect, the invention provides an amusement device
11 comprising an image carrying substrate with an image surface having a front end
12 and a rear end and means for providing a reflecting surface extending
13 transversely from the rear end, the image surface being marked with a first set of
14 image fragments and a second set of image fragments for forming, respectively,
15 first and second composite image components, image fragments of the second
16 set being both differently shaped or configured and laterally inverted to image
17 fragments of the first set and arranged alternately along the image surface to
18 image fragments of the first set, selection means on the substrate for selectively
19 exposing the image fragments of the first set to the front, away from the reflecting
20 surface, and for selectively exposing the image fragments of the second set to the
21 rear, for reflection in the reflecting surface, so that the image fragments of the first
22 set and the image fragments of the second set combine to form first and second
23 image components, respectively, seen by viewing the first set of image fragments
24 directly from the front and by viewing, simultaneously, the second set of image
25 fragments by reflection in the transversely extending reflecting surface so that the
26 first and second image components combine to provide a continuous composite
27 image which cannot be readily predicted by a spectator casually viewing the
28 image surface.

29 Preferably, the image fragments are formed as strips extending across the
30 image carrying surface parallel to the reflecting surface.

1 In one version, the image carrying surface is covered by a lenticular screen
2 lens so that image fragment of the first set and the image fragments of the
3 second set can be seen clearly only alternatively by viewing the image carrying
4 surface from respective opposite directions and that the second set can be clearly
5 seen only by reflection in the mirror.

6 In another version the image carrying surface is corrugated with each
7 corrugation extending parallel to the planar reflecting surface and having the
8 cross-section of an isosceles triangle providing an image carrying surface with first
9 and second upwardly inclined facets alternating as they extend away from the
10 mirror and providing, respectively, first and second sets of image fragments of the
11 first and second image components, facing forwards towards the spectator and
12 rearward for reflection in the mirror respectively.

13 The image carrying surface may be formed by providing a first picture
14 identical to the composite image and a second picture which is a mirror image
15 thereof, dividing both pictures horizontally at identical locations into upper and
16 lower contiguous portions and dividing the lower portion of the first picture into a
17 series of individual horizontal strips corresponding to image fragments of the first
18 set forming the precursor of the first image component, inverting the second
19 picture and dividing the upper portion of the second picture into a series of
20 individual horizontal strips corresponding to image fragments of the second set to
21 form the precursor of the second image component, and interlacing the individual
22 strips of the first set with the individual strips of the second set.

23 The amusement device may be incorporated in greetings card with the
24 image carrying face covering the inside of one flap of a folded sheet and the
25 reflecting surface covering the inside of the opposite flap, so that the composite
26 picture, possibly the portrait of the giver or recipient, can be seen when the card is
27 opened with the fold remote from the user to extend the flaps perpendicularly to
28 each other. An analogous application would be in a children's book, possibly pop-
29 up, or with the reflective surface and image carrying surface on adjacent pages.

30 Another application of the invention resides in interior decoration where an

1 image of an object formed by the image carrying substrate described above in the
2 room reflected from a mirror is different from the image which would be expected by
3 a person looking into the mirror simultaneously viewing or having viewed the image
4 carrying substrate directly when in front of the mirror. Particularly where the image
5 carrying substrate is arranged closely adjacent the mirror, possibly intersecting the
6 mirror plane so that the reflected image would normally be expected to be mirror
7 image extending continuously from the direct image, the appearance of a different,
8 reflected image can provide an impression or illusion that the room is of significantly
9 greater size, extending beyond the mirror plane, a much sought after effect,
10 particularly in city apartments. In a particularly effective version, the image seen in
11 the mirror may be a landscape while the direct images may be of objects expected
12 to be seen in the foreground of the landscape.

13 According to another aspect of the invention, there is provided a room having
14 a wall extending perpendicularly in front of a mirror, the wall having a surface
15 carrying a first set of image fragments and a second set of image fragments for
16 forming, respectively, first and second composite image components, image
17 fragments of the second set being both differently shaped or configured and
18 laterally inverted to image fragments of the first set and arranged alternately along
19 the wall surface to image fragments of the first set, selection means on the wall
20 surface for selectively exposing the image fragments of the first set away from the
21 mirror and for selectively exposing the image fragments of the second set for
22 reflection in the mirror so that the image fragments of the first set and the image
23 fragments of the second set combine to form first and second image components,
24 respectively, seen by a person in front of the mirror viewing the first set of image
25 fragments directly and by viewing, simultaneously, the second set of image
26 fragments by reflection in the mirror so that the first and second image
27 components combine to provide a continuous composite image which cannot be
28 readily predicted by the person casually viewing the image fragments on the wall
29 surface providing the impression that the room is of increased size extending
30 beyond the mirror plane.

1 The invention further provides a room having a wall extending
2 perpendicularly in front of a mirror, the wall having a surface carrying a first set of
3 image fragments and a second set of image fragments for forming, respectively,
4 first and second images, image fragments of the second set being both differently
5 shaped or configured and laterally inverted to image fragments of the first set and
6 arranged alternately along the wall surface to image fragments of the first set,
7 selection means on the wall surface for selectively exposing the image fragments
8 of the first set away from the mirror for viewing as the first image only directly by a
9 person in front of the mirror and for selectively exposing the image fragments of
10 the second set for viewing, simultaneously, by reflection in the mirror as the
11 second image so that a person in the room sees that the second image is aligned
12 with the first image but different from a mirror reflection of the first image providing
13 the impression that the second image arises from an object behind the mirror and
14 thereby that the room is of increased size extending beyond the mirror plane.

15 In another application the image carrier surface is mounted in a viewing box
16 covering the top so as to prevent the spectator looking vertically down onto the
17 image carrier so only the first set of image forming fragments can be seen by direct
18 transmission at any time.

BRIEF INTRODUCTION TO THE DRAWINGS

20 In order that the invention may be readily understood, specific embodiments
21 thereof will now be described with reference to the accompanying drawings in
22 which:

Figures 1a -1i are schematic views illustrating successive steps in forming an amusement device including an image carrier sheet illustrating the head of a bear;

26 Figures 2a is a schematic plan view of another image carrier sheet in flat
27 condition:

28 Figures 2b and 2c are schematic perspective views from respective opposite

1 ends of the image carrier sheet of Figure 2a when folded to form corrugations
2 showing the image strips seen directly and by reflection, respectively;

3 Figure 3 is a schematic perspective view of the image carrier substrate of
4 Figure 2b mounted on a display box having a lid mounting a suitably positioned
5 mirror to show the resulting composite image;

6 Figure 4 is a schematic perspective view of the a corner of a bathroom with
7 tiles forming image carrying substrates suitably positioned in front of a mirror
8 showing the different reflected images formed by second sets of image fragments
9 on respective.

DESCRIPTION OF PARTICULAR EMBODIMENTS

As shown in Figures 1a -1g, an image surface may be formed by providing a first picture 1 shown by Figure 1a identical to the composite image and a second picture 2 which is a mirror image thereof shown by Figure 1b. Respective pictures are then divided horizontally at identical locations into upper and lower contiguous portions 11 and 21 as shown in Figures 1c and 1d, respectively, and the lower portion 11 of the first picture 1 is then divided into a series of individual horizontal strips 13 corresponding to image fragments of a first set forming the precursor of a first image component as shown in Figure 1e. The upper portion 21 of the second picture is inverted and divided into a series of individual horizontal strips 23 corresponding to image fragments of a second set as shown in Figure 1f to form the precursor of a second image component, and the individual strips 13 of the first and second sets are then interlaced so as to be positioned contiguously and alternately, to form an image carrier sheet 24, as shown in Figure 1g.

The division of the pictures into image fragment strips and the manipulation of the image fragment strips for correct positioning can be carried out manually or automatically by a suitably programmed computer.

The image carrying sheet 24 is then folded in alternating directions along the boundaries between the respective image fragments or strips forming parallel corrugations, as shown in Fig 1h, and positioned in front of a mirror 25 with each

1 corrugation extending parallel to the planar reflecting surface and having the
2 cross-section of an isosceles triangle providing an image surface with first and
3 second upwardly inclined facets, alternating as they extend away from the
4 reflecting surface thereby positioning, respective first sets of image fragments and
5 second sets of image fragments of the first and second image components,
6 respectively, facing forwards towards the spectator and rearward for reflection by
7 the reflecting surface, respectively, resulting in the image shown in Fig 1a being
8 seen as a composite image partly by direct transmission and partly by reflection,
9 as shown in Fig 1i.

10 In particular, it will be noted that the composite image is not apparent from
11 glancing directly at the substrate.

12 In the second example, employing a simple picture of a heart for purposes
13 of easy illustration of the principles underlying the invention, Fig 2a shows the flat
14 substrate or image sheet comprising the alternating image strips 13' and 23' for
15 direct viewing and for viewing by reflection, respectively, and Fig 2b and 2c are
16 views of respective opposite ends of the image carrier sheet/substrate when folded
17 to form corrugations showing the image strips for viewing directly and by reflection,
18 respectively, with the composite image seen when the folded sheet is mounted in a
19 display box with a mirror on the inside of a hinged lid, as shown in Fig 3 (although
20 the corrugated sheet has more corrugations for a better effect in practice, as shown
21 in Fig 3).

22 Alternatively, as shown in Figure 5, instead of forming corrugations, a
23 suitable lenticular screen 26 may be placed over the flat image carrying sheet, so
24 that image fragment of the first set and the image fragments of the second set can
25 be seen clearly only alternatively by viewing the image surface from respective
26 opposite directions and that the second set can be clearly seen only by reflection
27 in a reflecting surface positioned upright transversely of one end of the image
28 carrying sheet.

29 According to a third example of the invention shown in Figure 4, a bathroom
30 has a tiled wall 31 extending perpendicularly in front of a mirror 32 with surfaces of

1 respective individual tiles 33 having triangular section corrugations forming first and
2 second sets of inclined facets facing away from and toward the mirror, respectively,
3 and marked with first and second sets of image fragments. Image fragments of the
4 first set combine to form symbols of hearts, clubs, diamonds and spades on
5 respective vertically adjacent tiles when viewed directly by a spectator in front of the
6 mirror while image fragments of the second set combine to form symbols of clubs,
7 diamonds, spades and hearts, respectively, instead of the expected mirror images
8 of the first set.

9 This is a surprising and, at least initially, puzzling result providing the
10 immediate impression that the second set of images arise from objects behind the
11 mirror plane, with the mirror surface being overlooked providing the impression that
12 the room is of increased size extending beyond the mirror plane.